

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-147312

(43)Date of publication of application : 29.05.2001

(51)Int.Cl.

G02B 5/20

H04N 5/72

H05K 9/00

(21)Application number : 11-328978

(71)Applicant : FUJITSU GENERAL LTD

(22)Date of filing : 19.11.1999

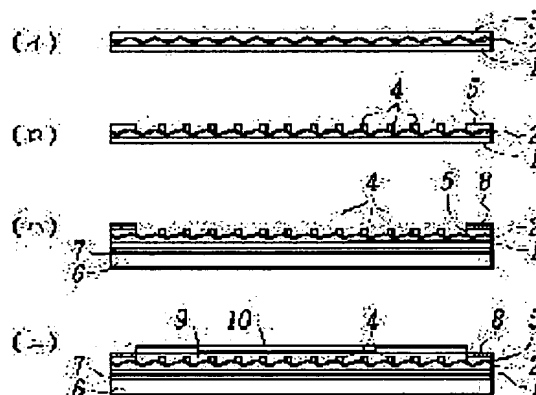
(72)Inventor : SATO HIROKI

## (54) FILTER DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To improve the transparency of a copper foil mesh film to be used to cut the leaked electromagnetic waves of an optical filter to be disposed on the front of a PDP.

**SOLUTION:** (1) A copper foil 3 is laminated with a transparent adhesive 2 on a PET substrate 1, and (2) the copper foil is etched to form a mesh 4, while the peripheral part is left which is not etched so as to be used as a grounding electrode 5. (3) The mesh film formed in the step (2) is laminated with a transparent adhesive 7 on a reinforced glass sheet 6, and a mask 8 is stuck on the grounding electrode part. (4) A UV-curing resin 9 is applied on the mesh, a transparent sheet 10 is mounted thereon, pressed and laminated by using roller, and irradiated with UV rays to harden the UV-curing resin, and then the mask is peeled. The adhesive 2 and the UV-curing resin used have the same refractive indices, so that refraction of light will not occur on the interface to obtain high transparency. Films for correcting the developed colors of a PDP, cutting near-IR rays, preventing reflection or the like are laminated on the lower face of the reinforced glass sheet.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

**\* NOTICES \***

**JPO and NCIPi are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**CLAIMS**

---

**[Claim(s)]**

[Claim 1] It is prepared in the front face of PDP (plasma display panel). Acid resisting of outdoor daylight, It is what covers amendment of the luminescent color of PDP, cutoff of the wavelength wave of the near infrared ray field emitted from PDP, and the leakage electromagnetic wave from PDP. Electric shielding of said leakage electromagnetic wave The base material of transparent synthetic resin, and the copper foil mesh which pasted copper foil together with the transparent binder and was formed by etching of copper foil on the base material, Filter equipment which comes to be what is performed with the mesh film which consisted of transparent UV (ultraviolet rays) hardening resin applied on a copper foil mesh, and a transparence sheet pasted together on UV hardening resin, was made to harden UV hardening resin by the exposure of UV beam of light, and was formed.

[Claim 2] It is prepared in the front face of PDP. Acid resisting of outdoor daylight, amendment of the luminescent color of PDP, It is what covers the cutoff of the wavelength wave of a near infrared ray field and the leakage electromagnetic wave from PDP which are emitted from PDP. Electric shielding of said leakage electromagnetic wave Paste copper foil together by adhesion material to the base material of transparent synthetic resin, and a copper foil mesh is formed by etching of copper foil. Filter equipment which comes to be what is performed with the mesh film formed by removing said transparence plate after having applied transparent UV hardening resin on a copper foil mesh, having pasted together the transparence plate which performed mold release processing on UV hardening resin, irradiating UV beam of light and stiffening said UV hardening resin.

[Claim 3] the filter equipment according to claim 1 or 2 which pastes said mesh film together to the 1st page of a tempered glass plate, and pasted together the film for amendment of cutoff of the wavelength wave of the near infrared ray field which a tempered glass plate is alike on the other hand, and is emitted from PDP, and the luminescent color of PDP, and the film for acid resisting of outdoor daylight.

[Claim 4] The binder and UV hardening resin for adhering said copper foil are filter equipment according to claim 1, 2, or 3 the rate of optical refraction uses the same thing, and it was made for reflection of light not to produce in the interface of a binder and UV hardening resin.

[Claim 5] Filter equipment according to claim 1 which uses PET (polyethylene terephthalate) resin for said base material, and used a polycarbonate, an acrylic, or PET for said transparence sheet.

[Claim 6] Filter equipment according to claim 1 or 2 which enabled it to perform ground connection of a copper foil mesh easily by giving a mask to the perimeter of said copper foil mesh before spreading of said UV hardening resin, and removing said mask after hardening of UV resin by the exposure of UV beam of light.

---

[Translation done.]

**\* NOTICES \***

**JPO and NCIPi are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the filter equipment formed in the front face of PDP (plasma display panel), and relates to what improves the transparency of the mesh film for electromagnetic wave leakage control.

[0002]

[Description of the Prior Art] Although PDP excites the molecule of the xenon gas enclosed by inter-electrode discharge, excite a fluorescent material by the ultraviolet rays to generate, the light of a light field is made to emit light and an image is displayed, an electromagnetic wave occurs by this discharge, and although it is small, an electromagnetic wave is revealed outside. A light filter (it constitutes from tempered glass) is prepared in the front face of PDP for cutoff of the wavelength of the near infrared ray field which PDP besides the leakage control of this electromagnetic wave emits, color tone amendment of the luminescent color, acid resisting of outdoor daylight, etc. Although there are some which pasted copper foil 3 with a thickness of about 10 micrometers together with the binder 2 on the PET (polyethylene terephthalate) base material 1, exfoliated copper foil 3 in the shape of mesh 4 by (b) etching processing, formed the mesh film, and pasted this together to the light filter in the leakage control of an electromagnetic wave as shown for example, in the drawing 4 (\*\*), by exfoliation of copper foil, a binder 2 remains in concave convex, the light from PDP is refracted and scattered about with this irregularity, and it becomes opaque. 5 is an electrode for touch-down for connecting a mesh 4 to touch-down. For this reason, etching (Ha) processing was turned up, the hot melt type adhesives 21 are applied, and it is 100 on it. The PET film 22 about mum is put and there is the approach of pasting together by thermocompression bonding. Adhesives 21 are filled up with this thermocompression bonding into a concavo-convex hollow, optical refraction and dispersion are suppressed, and the transparency of a mesh film goes up. However, a foreign matter 23 may be won in the case of thermocompression bonding, and it becomes sticking-by-pressure marks, and distortion 24 arises, it becomes poor [ an appearance ], and there is a problem that the yield falls.

[0003]

[Problem(s) to be Solved by the Invention] Etching processing of the copper foil is carried out, it faces pasting a transparence sheet together to this, and the cost of a production facility increases to make winning of a foreign matter into zero. This invention selects suitably the member for adhesion which it is made for distortion by the sticking-by-pressure marks of a foreign matter not to arise even if there is winning of a foreign matter on the occasion of pasting of a transparence sheet, and is applied after that copper foil processes [ etching ], reduces optical refraction and dispersion, and aims at raising the transparency of a mesh film.

[0004]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, with the filter equipment of this invention It is prepared in the front face of PDP. Acid resisting of outdoor daylight, amendment of the luminescent color of PDP, It is what covers the cutoff of the wavelength wave of a near infrared ray field and the leakage electromagnetic wave from PDP which are emitted from PDP. Electric shielding of said leakage electromagnetic wave The base material of transparent synthetic resin, and the copper foil mesh which pasted copper foil together with the transparent binder and was formed by etching of copper foil on the base material, It consists of transparent UV (ultraviolet rays) hardening resin applied on a copper foil mesh, and a transparence sheet pasted together on UV hardening resin, and it constitutes so that it may be performed by the mesh film which was made to harden UV hardening resin by the exposure of UV beam of

light, and was formed.

[0005] Or after electric shielding of said leakage electromagnetic wave pasted copper foil together by adhesion material to the base material of transparent synthetic resin, it formed a copper-foil mesh by etching of copper foil, applies transparent UV hardening resin on a copper-foil mesh, pastes together the transparence plate which performed mold-release processing on UV hardening resin, irradiates UV beam of light and stiffens UV hardening resin, the mesh film formed by removing a transparence plate is made it performing.

[0006] in addition, a mesh film is pasted together to the 1st page of a tempered glass plate, and the film for amendment of cutoff of the wavelength wave of the near infrared ray field of a tempered glass plate which is alike on the other hand and is emitted from PDP, and the luminescent color of PDP, and the film for acid resisting of outdoor daylight are pasted together.

[0007] The rate of optical refraction uses the same thing, for example, the thing of 1.5762, and it is made for reflection of light not to produce the binder and UV hardening resin for adhering said copper foil in the interface of a binder and UV hardening resin.

[0008] Moreover, PET is used for a base material and a polycarbonate, an acrylic, or PET is used for a transparence sheet. In that case, coating thickness of UV hardening resin is set to about 50 micrometers, and thickness is 0.5mm to a transparence sheet. The surface smoothness of the front face of a transparence sheet is obtained using the above thing.

[0009] In addition, it enables it to perform ground connection of a copper foil mesh easily by giving a mask to the perimeter of a copper foil mesh before spreading of UV hardening resin, and removing a mask after hardening of UV resin by the exposure of UV beam of light.

[0010]

[Embodiment of the Invention] The gestalt of implementation of invention is explained with reference to a drawing based on an example. Drawing 1 is the important section configuration sectional view of one example of the filter equipment by this invention. 1 of drawing is a transparent base material made of synthetic resin, for example, is a PET film. For the mesh in which a binder and 3 were formed in by copper foil, and 4 was formed for 2 and 7 by etching of copper foil 3, and 5, as for a tempered glass plate and 8, the electrode for touch-down and 6 are [ a mask and 9 ] UV hardening resin. 10 is a transparence sheet, for example, is a polycarbonate, an acrylic, or a product made from PET. Drawing 2 is the important section configuration sectional view of other examples, and 11 is a transparence plate, for example, it is an acrylic board.

[0011] In the case of drawing 1 , like (b), copper foil 3 with a thickness of about 10 micrometers is pasted together with the transparent binder 2, like (b), etching processing of the copper foil is carried out, and a mesh 4 is formed on the PET base material 1. It leaves the perimeter of a mesh 4, without etching in order to consider as the electrode 5 for touch-down (refer to drawing 3 ). Since surface roughening of the rear face is carried out so that, as for copper foil, what is shown in this (b) may be easy to be pasted together with a mesh film, the irregularity of a binder 2 remains for having exfoliated by etching. Subsequently, like (Ha), on the tempered glass plate 6, use a binder 7 and a mesh film (it consists of the PET base material 1, a 2 mesh binder 3, and an electrode 5 for touch-down) is pasted together. A mask 8 is stuck on the part of the electrode 5 for touch-down, like (\*\*), UV hardening resin 9 is applied to the thickness of about 50 micrometers on a mesh 4, thickness puts the transparence sheet 10 (an acrylic, a polycarbonate, or product made from PET) more than 0.5 mm on this, and a roller is pressed [ covering it ] and pasted together. And after irradiating UV beam of light and stiffening UV hardening resin 9, a mask 8 is removed and a mesh 4 is connected to touch-down through the electrode 5 for touch-down. Since thickness is in the transparence sheet 10, a foreign matter can also be absorbed by being won at the time of an activity, and foreign matter marks cannot remain, and surface surface smoothness can be obtained with this thickness.

[0012] Since there is irregularity in the top face of a binder 2 as mentioned above, an interface with UV hardening resin 9 also presents irregularity. Then, it prevents reflecting and scattering about light by the interface using the thing (for example, 1.5762) of the same optical refractive index as a binder 2 and UV hardening resin 9, and transparency is raised. And the film for amendment of cutoff of the wavelength wave of the near infrared ray field emitted to other fields (inferior surface of tongue of drawing) of the tempered glass plate 6 from PDP and the luminescent color of PDP and the film for acid resisting of outdoor daylight are pasted together. A mesh 4 side is turned and attached in PDP, and the gloss of copper foil enables it not to be easily reflected in people's eyes.

[0013] In the above-mentioned case, the transparence sheet 10 is cut in the dimension which is not applied to a mask 8, needs to paste together by carrying out location \*\*\*\*, or needs to paste a larger transparence

sheet than outside \*\* together, and needs to cut the part of a mask 8, and its productive efficiency is [ all ] bad. Then, as shown in the drawing 2 (\*\*), after the thickness which performed mold release processings (fluoridization etc.) putting and pressing the transparence plates 11 (acrylic board etc.) which are 0.5 - 1.5 mm extent at the rear face, making it the front face of UV hardening resin 9 turn into a smooth flat side by this, irradiating UV light and stiffening UV hardening resin 9 on UV hardening resin 9, you may make it remove the transparence plate 11. If this approach is used, the alignment of a transparence sheet 10 like [ in the case of drawing 1 ] or a larger transparence sheet than outside \*\* can be pasted together, and the time and effort of cutting a mask part can be saved.

[0014]

[Effect of the Invention] Since what has a the same optical refractive index is used for the binder and UV hardening resin for pasting copper foil together according to the filter equipment by this invention as explained above, light does not reflect by the interface (concave convex) of a binder and UV hardening resin, and transparency improves. Moreover, thickness is 0.5mm on UV hardening resin. Since the above transparence sheet is put and it pastes together, covering a roller, even if a foreign matter is won at the time of an activity, foreign matter marks of a poor appearance all decrease, the yield goes up, and productivity improves. Moreover, if the transparence plate which carried out mold release processing is put and pressed on UV hardening resin, UV light is irradiated, UV hardening resin is stiffened and a transparence plate is removed, time and effort, such as a cut of the mask part which pastes the alignment of a transparence sheet or a larger transparence sheet than outside \*\* together, can be saved.

---

[Translation done.]

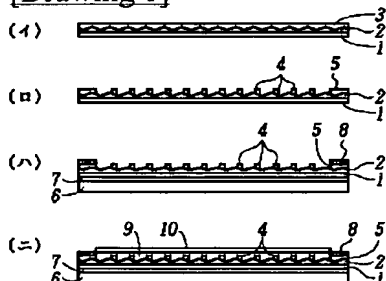
## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

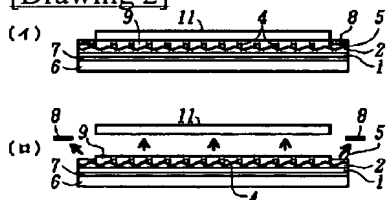
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

[Drawing 1]



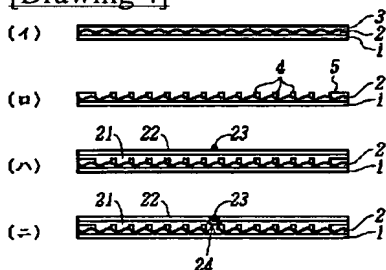
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-147312

(43)Date of publication of application : 29.05.2001

(51)Int.Cl.

G02B 5/20

H04N 5/72

H05K 9/00

(21)Application number : 11-328978

(71)Applicant : FUJITSU GENERAL LTD

(22)Date of filing : 19.11.1999

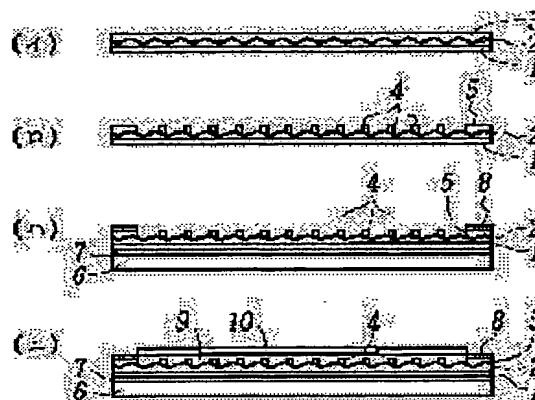
(72)Inventor : SATO HIROKI

## (54) FILTER DEVICE

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To improve the transparency of a copper foil mesh film to be used to cut the leaked electromagnetic waves of an optical filter to be disposed on the front of a PDP.

**SOLUTION:** (1) A copper foil 3 is laminated with a transparent adhesive 2 on a PET substrate 1, and (2) the copper foil is etched to form a mesh 4, while the peripheral part is left which is not etched so as to be used as a grounding electrode 5. (3) The mesh film formed in the step (2) is laminated with a transparent adhesive 7 on a reinforced glass sheet 6, and a mask 8 is stuck on the grounding electrode part. (4) A UV-curing resin 9 is applied on the mesh, a transparent sheet 10 is mounted thereon, pressed and laminated by using roller, and irradiated with UV rays to harden the UV-curing resin, and then the mask is peeled. The adhesive 2 and the UV-curing resin used have the same refractive indices, so that refraction of light will not occur on the interface to obtain high transparency. Films for correcting the developed colors of a PDP, cutting near-IR rays, preventing reflection or the like are laminated on the lower face of the reinforced glass sheet.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

(19)日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11)特許出願公開番号

特開2001-147312

(P2001-147312A)

(43)公開日 平成13年5月29日(2001.5.29)

(51)Int.Cl. <sup>7</sup>	識別記号	F I	テームト <sup>*</sup> (参考)
G 0 2 B 5/20		G 0 2 B 5/20	2 H 0 4 8
H 0 4 N 5/72		H 0 4 N 5/72	A 5 C 0 5 8
H 0 5 K 9/00		H 0 5 K 9/00	V 5 E 3 2 1

審査請求 未請求 請求項の数6 O L (全 4 頁)

(21)出願番号 特願平11-328978

(22)出願日 平成11年11月19日(1999.11.19)

(71)出願人 000006611

株式会社富士通ゼネラル

神奈川県川崎市高津区末長1116番地

(72)発明者 佐藤 裕樹

川崎市高津区末長1116番地 株式会社富士  
通ゼネラル内

Fターム(参考) 2H048 AA05 AA07 AA09 AA11 AA18

AA24 AA27

5C058 AA11 AB05 BA35

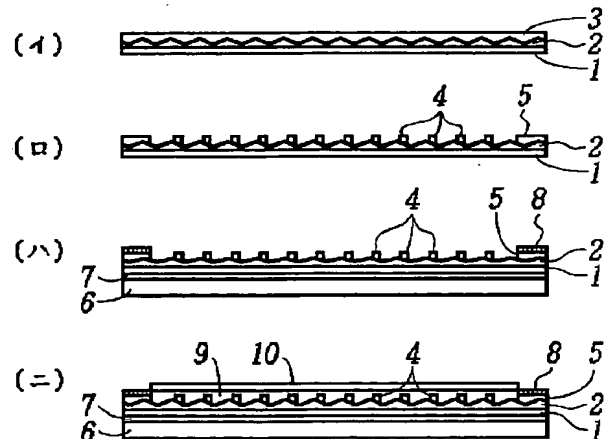
5E321 AA04 BB23 CC16 GG05 CH01

(54)【発明の名称】 フィルタ装置

(57)【要約】

【課題】 PDPの前面に設ける光学フィルタの漏洩電磁波遮蔽のための銅箔メッシュフィルムの透明度を上げる。

【解決手段】 (イ) PET基材1上に透明な粘着剤2で銅箔3を貼合し、(ロ) 銅箔のエッチング処理でメッシュ4を形成し、周囲は接地用電極5とするためエッチングせずに残す。(ハ) ロで形成されたメッシュフィルムを強化ガラス板6に透明な粘着剤7で貼合し、接地用電極部分にマスク8を貼り、(ニ) この上にUV硬化樹脂9を塗布し、透明シート10を乗せ、ローラーをかけて押圧・貼合し、UV光線を照射し、UV硬化樹脂を硬化させた後、マスクを剥がす。粘着剤2とUV硬化樹脂に同じ光屈折率のものをを用い、界面で光が屈折せず、高い透明度が得られるようにする。強化ガラス板の下面にPDPの発色補正、近赤外線の遮断、および反射防止等のためのフィルムを貼合する。





## 【特許請求の範囲】

【請求項1】 PDP（プラズマディスプレイパネル）の前面に設けられ、外光の反射防止、PDPの発光色の補正、PDPより放出される近赤外線領域の波長波の遮断およびPDPからの漏洩電磁波の遮蔽を行うものであって、前記漏洩電磁波の遮蔽は、透明な合成樹脂の基材と、基材上に透明な粘着剤で銅箔を貼合し、銅箔のエッチングにより形成した銅箔メッシュと、銅箔メッシュ上に塗布した透明なUV（紫外線）硬化樹脂と、UV硬化樹脂上に貼合した透明シートとからなり、UV光線の照射によりUV硬化樹脂を硬化させて形成したメッシュフィルムにより行われるものでなるフィルタ装置。

【請求項2】 PDPの前面に設けられ、外光の反射防止、PDPの発光色の補正、PDPより放出される近赤外線領域の波長波の遮断およびPDPからの漏洩電磁波の遮蔽を行うものであって、前記漏洩電磁波の遮蔽は、透明な合成樹脂の基材に粘着材で銅箔を貼合し、銅箔のエッチングにより銅箔メッシュを形成し、銅箔メッシュ上に透明なUV硬化樹脂を塗布し、UV硬化樹脂上に離型処理を施した透明板を貼合し、UV光線を照射し、前記UV硬化樹脂を硬化させた後、前記透明板を取り外すことにより形成されたメッシュフィルムにより行うものでなるフィルタ装置。

【請求項3】 前記メッシュフィルムを強化ガラス板の1面に貼合し、強化ガラス板の他面に、PDPより放出される近赤外線領域の波長波の遮断およびPDPの発光色の補正のためのフィルム、および外光の反射防止用フィルムを貼合するようにした請求項1または2記載のフィルタ装置。

【請求項4】 前記銅箔を粘着するための粘着剤およびUV硬化樹脂は、光の屈折率が同じものを使用し、粘着剤とUV硬化樹脂との界面で光の反射が生じないようにした請求項1、2または3記載のフィルタ装置。

【請求項5】 前記基材にはPET（ポリエチレンテレフタレート）樹脂を使用し、前記透明シートにはポリカーボネート、アクリルまたはPET樹脂を使用するようにした請求項1記載のフィルタ装置。

【請求項6】 前記UV硬化樹脂の塗布の前に前記銅箔メッシュの周囲にマスクを施し、UV光線の照射によるUV樹脂の硬化後、前記マスクを剥がすことにより、銅箔メッシュの接地接続を容易に行えるようにした請求項1または2記載のフィルタ装置。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明はPDP（プラズマディスプレイパネル）の前面に設けるフィルタ装置に係り、電磁波漏洩防止用のメッシュフィルムの透明度を向上するものに関する。

【0002】

【従来技術】PDPは、電極間の放電により封入され

ているキセノンガスの分子を励起し、発生する紫外線で蛍光物質を励起し、可視光領域の光を発光させ映像を表示するが、この放電により電磁波が発生し、僅かではあるが外部に電磁波が漏洩する。この電磁波の漏洩防止の他、PDPの発する近赤外線領域の波長の遮断、発光色の色調補正および外光の反射防止等のため、PDPの前面に光学フィルタ（強化ガラスで構成）が設けられる。電磁波の漏洩防止には、例えば、図4（イ）に示すように、PET（ポリエチレンテレフタレート）基材1上に粘着剤2で厚さ約10 $\mu$ mの銅箔3を貼合し、（ロ）エッチング処理により銅箔3をメッシュ4状に剥離し、メッシュフィルムを形成し、これを光学フィルタに貼合したものがあがるが、銅箔の剥離で粘着剤2が凹凸状に残り、この凹凸によりPDPからの光が屈折・散乱し、不透明になる。5はメッシュ4を接地に接続するための接地用電極である。このため、（ハ）エッチング処理した上にホットメルトタイプの接着剤21を塗布し、その上に100 $\mu$ m程度のPETフィルム22を乗せ、熱圧着で貼合する方法がある。この熱圧着で凹凸の窪みに接着剤21が充填され、光の屈折・散乱が抑えられ、メッシュフィルムの透明度が上がる。ところが、熱圧着の際に異物23が抱き込まれることがあり、圧着痕となって歪み24が生じ、外観不良となり、歩留りが低下するという問題がある。

【0003】

【発明が解決しようとする課題】銅箔をエッチング処理し、これに透明シートを貼合するに際し、異物の抱き込みをゼロにするには生産設備のコストが嵩む。本発明は、透明シートの貼合に際し異物の抱き込みがあっても異物の圧着痕による歪みが生じないようにし、また、銅箔のエッチング処理の上に塗布される接着用部材を適宜に選定し、光の屈折・散乱を低減し、メッシュフィルムの透明度を上げることを目的とする。

【0004】

【課題を解決するための手段】上記目的を達成するため、本発明のフィルタ装置では、PDPの前面に設けられ、外光の反射防止、PDPの発光色の補正、PDPより放出される近赤外線領域の波長波の遮断およびPDPからの漏洩電磁波の遮蔽を行うものであって、前記漏洩電磁波の遮蔽は、透明な合成樹脂の基材と、基材上に透明な粘着剤で銅箔を貼合し、銅箔のエッチングにより形成した銅箔メッシュと、銅箔メッシュ上に塗布した透明なUV（紫外線）硬化樹脂と、UV硬化樹脂上に貼合した透明シートとからなり、UV光線の照射によりUV硬化樹脂を硬化させて形成したメッシュフィルムにより行われるように構成する。

【0005】または、前記漏洩電磁波の遮蔽は、透明な合成樹脂の基材に粘着材で銅箔を貼合し、銅箔のエッチングにより銅箔メッシュを形成し、銅箔メッシュ上に透明なUV硬化樹脂を塗布し、UV硬化樹脂上に離型処理を施した透明板を貼合し、UV光線を照射し、UV硬化

樹脂を硬化させた後、透明板を取り外すことにより形成されたメッシュフィルムにより行うようにする。

【0006】なお、メッシュフィルムを強化ガラス板の1面に貼合し、強化ガラス板の他面にPDPより放出される近赤外線領域の波長波の遮断およびPDPの発光色の補正のためのフィルムと、外光の反射防止用フィルムとを貼合するようにする。

【0007】前記銅箔を粘着するための粘着剤およびUV硬化樹脂は、光の屈折率が同じもの、例えば、1.5762のものを使用し、粘着剤とUV硬化樹脂との界面で光の反射が生じないようにする。

【0008】また、基材にはPET樹脂を使用し、透明シートにはポリカーボネート、アクリルまたはPET樹脂を使用するようにする。その際、UV硬化樹脂の塗布厚を約50 $\mu$ mとし、透明シートに厚みが0.5mm以上のものを用い、透明シートの表面の平坦性が得られるようにする。

【0009】なお、UV硬化樹脂の塗布の前に銅箔メッシュの周囲にマスクを施し、UV光線の照射によるUV樹脂の硬化後、マスクを剥がすことにより、銅箔メッシュの接地接続を容易に行えるようにする。

【0010】

【発明の実施の形態】発明の実施の形態を実施例に基づき図面を参照して説明する。図1は本発明によるフィルタ装置の一実施例の要部構成断面図である。図の1は透明な合成樹脂製の基材で、例えば、PETフィルムである。2および7は粘着剤、3は銅箔、4は銅箔3のエッチングで形成されたメッシュ、5は接地用電極、6は強化ガラス板、8はマスク、9はUV硬化樹脂である。10は透明シートで、例えば、ポリカーボネート、アクリルまたはPET製である。図2は他の実施例の要部構成断面図で、11は透明板で、例えば、アクリル板である。

【0011】図1の場合、(イ)の如く、PET基材1上に厚さ約10 $\mu$ mの銅箔3を透明な粘着剤2により貼合し、(ロ)の如く、銅箔をエッチング処理し、メッシュ4を形成する。メッシュ4の周囲は接地用電極5とするためエッチングせずに残す(図3参照)。この(ロ)に示すものがメッシュフィルムで、銅箔は貼合されやすいように裏面が粗面処理されているため、エッチングで剥離したには粘着剤2の凹凸が残る。次いで、(ハ)の如く、メッシュフィルム(PET基材1、粘着剤2、メッシュ3および接地用電極5からなる)を強化ガラス板6上に粘着剤7を用いて貼合し、接地用電極5の部分にマスク8を貼り、(ニ)の如く、メッシュ4上にUV硬化樹脂9を約50 $\mu$ mの厚さに塗布し、この上に厚みが0.5mm以上の透明シート10(アクリル、ポリカーボネートまたはPET製)を乗せ、ローラーをかけて押圧し貼合する。そして、UV光線を照射し、UV硬化樹脂9を硬化させた後、マスク8を剥がし、接地用電極5を介してメッシュ4を接地に接続する。透明シート10に厚みがある

ので、作業時に異物が抱き込まれてもこれに吸収され、異物痕が残らず、かつ、この厚みにより表面の平坦性を得ることができる。

【0012】上述のように粘着剤2の上面には凹凸があるので、UV硬化樹脂9との界面も凹凸を呈する。そこで、粘着剤2とUV硬化樹脂9に同じ光屈折率のもの(例えば、1.5762)を用い、界面で光が反射し散乱するのを防ぎ、透明度を向上させる。そして、強化ガラス板6の他の面(図の下面)に、PDPより放出される近赤外線領域の波長波の遮断およびPDPの発光色の補正のためのフィルムと、外光の反射防止用のフィルムとを貼合する。PDPにはメッシュ4側を向けて取付け、銅箔の光沢が人の目に映りにくいようにする。

【0013】上記の場合、透明シート10はマスク8にかからない寸法に切断し、位置出しをして貼合するか、または、外寸より大きい透明シートを貼合し、マスク8の部分のカットする必要がある、何れも生産効率が悪い。そこで、図2(イ)に示す如く、UV硬化樹脂9の上に、裏面に離型処理(フッ素処理等)を施した厚みが0.5~1.5mm程度の透明板11(アクリル板等)を乗せて押圧し、これによりUV硬化樹脂9の表面が滑らかな平坦面になるようにし、UV光を照射してUV硬化樹脂9を硬化させた後、透明板11を取り外すようにしてもよい。この方法を用いれば、図1の場合のような透明シート10の位置合わせ、または外寸より大きい透明シートを貼合し、マスク部分のカットする等の手間を省くことができる。

【0014】

【発明の効果】以上に説明したように、本発明によるフィルタ装置によれば、銅箔を貼合するための粘着剤とUV硬化樹脂とに光屈折率の同じものを用いるので、粘着剤とUV硬化樹脂との界面(凹凸面)で光が反射することがなく、透明度が向上する。また、UV硬化樹脂の上に厚みが0.5mm以上の透明シートを乗せ、ローラーをかけて貼合するので、作業時に異物が抱き込まれても異物痕が残らず、外観不良が減って歩留りが上がり、生産性が向上する。また、UV硬化樹脂の上に離型処理した透明板を乗せて押圧し、UV光を照射しUV硬化樹脂を硬化させ、透明板を取り外すようにすれば、透明シートの位置合わせ、または外寸より大きい透明シートを貼合してのマスク部分のカット等の手間を省くことができる。

【図面の簡単な説明】

【図1】本発明によるフィルタ装置の一実施例の要部構成図である。

【図2】本発明によるフィルタ装置の他の実施例の要部構成図である。

【図3】接地用電極5の一例を示す図である。

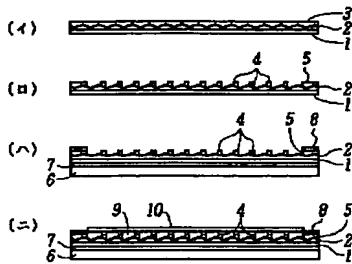
【図4】従来のフィルタ装置の一例の要部構成図である。

【符号の説明】

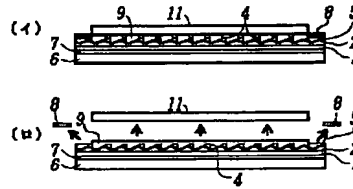
- 1 PET基材
- 2、7 粘着剤
- 3 銅箔
- 4 メッシュ
- 5 接地用電極
- 6 強化ガラス板
- 8 マスク
- 9 UV硬化樹脂

- 10 透明シート
- 11 透明板
- 21 接着剤
- 22 PETフィルム
- 23 異物
- 24 圧着痕

【図1】



【図2】



【図3】



【図4】

